TESSA Steering Group Meeting # 1

Location: Galway Mayo Institute of Technology

Venue: New Board Room

Date: 31st of October 2007

Time: 11:00 – 15:30

Minutes of Meeting

People attending the meeting:

Name	Affiliation
Carty, Bill	Arctic Charr Farm
Maher, Ken	MRI Carna
McElwee, Joe	I.F.A.
Norman, Mark	Taighde Mara Teo
O'Brien, Cindy	Abalone Aquaculture
Sikora, Paul	Dunstar
Toner, Damian	Aquaculture Initiative
Allen, Brendan	GMIT
Burke, Niall	GMIT
Dimache, Laurentiu	GMIT
Lohan, John	GMIT
Moran, Anthony	GMIT
O Connor, Ian	GMIT

Summary of Comments

- The group provides a link to industry
- It should feed current and future needs of industry with regard to energy supply and conservation
- Assist in design/layout of facility
- Dissemination - assist in two way communication

General Comments:

- View that the project is comprehensive
- There has to be a positive effect on the bottom line for the industry to accept it
- Focused on reduce energy consumption, alternative energy solutions; cost savings

- There is scope for future partnerships in this area

Suggestions WP1: <u>Establish Steering Group</u>

- Comments on composition: no comments on the steering group composition
- Suggestions for inclusion: it would be great to have all the people contacted but not available for the first meeting

Suggestions WP2: <u>National and International Best Practice Review</u>

- Chilling is probably biggest cost, some facilities use heat exchangers; Another opinion is that water pumping is the most energy demanding;
- Remember lots of species are novel, unable to take a risk with unproven technology – reliability is key
- Has to have backup support within short period of time,
- Diversification of needs: On-growing different to hatchery, shellfish different to finfish
- Can we remove species and just look at temperature and power
- Hatcheries have periodic energy demand
- Big land based units hundreds tonnes of water will require very high energy demand.
- This is steady state, more achievable and more economic, should be looking at this
- Large scale energy requirements could include:
- Initial pumping head
- Recirculating systems energy demand
- Temperature controls
- Balance between air and water temp
- Can be approached from cheap electricity or can we do the same job with less power
- Energy audits, can we map consumption, can we reduce consumption – then can we produce it more cheaply
- More literature sources: University of Virginia – Steven T. Sommerfelt , North Carolina – Losordo, Timmons, etc)

Suggestions WP3: <u>Determine energy demands in Irish RAS aquaculture</u>

- TESSA questionnaire: - 4 sections:

  A: Description of facility

  B: Opinion on components of systems, layout

  C: Profile energy usage

  D: Opinion on the research focus within GMIT

- Not enough of a pool where there's a large energy requirement - Perhaps 20 facilities here in Ireland
- Energy costs may be one of the factors limiting scale up
- Option of examining industry overseas – general feeling was stay in Ireland and concentrate on what is here, how can we increase profitability?
- Thermal storage – capture energy paid for, topping it up with energy you produce. Need high quality energy for pumping and blowers
- A genuine effort to reduce energy demand will be of assistance in future during eco audits.
- Oxygen generation is also demanding an important amount of energy

Suggestions WP4: <u>Assess renewable energies for RAS</u>

- What's being used at the moment?
- Wind pump for pond system
- Fanad were using solar heat panels (unsure), but they have a need for chilled water
- Up to 75% savings on energy costs associated with using ground source heat pumps versus conventional boilers and chilling
- Economics for using alternative sources (e.g. heat pumps) are good where the demands exist for heating and cooling
- When embedding new technology reliability should be looked at first, then examine costs.
- Probably a lack of knowledge in the industry on what is available, industry is getting grips with developing industry in terms of recirculating systems, add alternative energy systems to this might be too much
- What about usage factors, e.g. 10m^3 per hour - are they commercially viable, get more viable as size increases?
- Small commercial system is 5 litres per second – up to 100 for large systems. Keep temperature drop per pass to 2 to 5 degrees
- What's the average lifespan of a farm operation
- If you can 0.33 of a year fulltime duty then payback is 5 to 6 years, decreasing as usage increases
- Refrigerant leak is a problem, can lose 25 to 50% of your capacity, critical components can be duplicated
- 100 tonne units requiring less that 30kWatt for heating and cooling
- When examining costs take in consideration you can only get 25kWatt increments in three phases. Overall there is lots of factors that control cost effectiveness
- Questionnaire must get to the heart of that question – what are we actually using electricity on
- Heat pumps can get 7 to 10 thermal kWatt for the price of 1 electrical kWatt, this depends on steady demand and smart design combining heating and cooling. Something that runs long term rather than intermittent demand is ideal
- Thermal solar collection may be considered
- Solar photovoltaic need could be small total 15kWatt – seen as an attempt when looking for alternative to ESB

- Planning permission seen as being a problem regarding wind power, review ongoing and the view is that this will change.
- Wind power may be appropriate for sea cages; there is a large demand for remote power. What about recycled small scale machines 25kw to 100 – 200kw, this should be investigated
- There is some development on grid connection in rural areas
- Minimising usage - keen to look at using waste energy, thermal storage (ground)
- What about insulation – are farms using appropriate insulation material
- Best to have about 50 to 60% of your thermal needs met by solar. If you attempt to get to 100% too costly, not feasible.
- In assessing costs - lifespan (capital investments) should be considered; look also at production cycle - capital cost over how many production cycles

Suggestions WP5: Software Model for Sustainable Energy in Aquaculture (S.E.A)

- This could be a design tool at start up – but also if you are planning to scale up, or to benchmark your existing system
- More appropriate for later stages in the project

Suggestions WP6: Learning Platform for Lectures/Workshops/Web-Access

- Training requirements – People require training in system design – making changes, adding on etc
- What way the steering group want to see the knowledge and information presented – technical and feasibility analysis shown (i.e. - what would be the energy generated by a hypothetical wind mill considering the windmill was installed and using the data logged by the weather

Suggestions WP7: Project Management and Dissemination

- No suggestions or comments
- Help on disseminating in the industry

Scope for future (next 6 months):

- Questionnaires completed and results summarised; full review of national energy used
- Strategy developed and possibly implemented for energy audits
- Facility fully developed and ready for Experimental analysis